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Appl. No. 10/762,164  
Reply to Office Action of July 17, 2006

Attorney Docket No. 2002-0246 / 24061,477  
Customer No. 42717

Amendments To The Claims

The following list of the claims replaces all prior versions and lists of the claims in this application.

Claims 1-27 (Cancelled).

28. (Previously presented) At least one high-k device, comprising:  
a structure having a strained substrate formed thereover, the strained substrate comprising an uppermost strained-Si epi layer, a middle relaxed  $Si_{1-x}Ge_x$  layer and a lowermost graded  $Si_{1-y}Ge_y$  layer;  
at least one dielectric gate oxide portion over the strained substrate, the at least one dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and  
a device over each of the at least one dielectric gate oxide portion to complete the at least one high-k device.

29. (Previously presented) The device of claim 28, the uppermost strained-Si epi layer having a thickness of from about 100 to 500Å; the middle relaxed  $Si_{1-x}Ge_x$  layer having a thickness of from about 1000 to 50,000Å; and the lowermost graded  $Si_{1-y}Ge_y$  layer having a thickness of from about 200 to 50,000Å.

30. (Previously presented) The device of claim 28, where x is greater than 0 and less than about 0.50 and where y is 0 or about 0 proximate the structure and increases to about x proximate the middle relaxed  $Si_{1-x}Ge_x$  layer, wherein  $x \geq y$ .

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31. (Previously presented) At least one high-k device, comprising:  
a structure having a strained substrate formed thereover, the strained substrate comprising  
an uppermost strained-Si epi layer, a middle  $Si_{1-x}Ge_x$  layer and a lower silicon oxide  
layer;  
at least one dielectric gate oxide portion over the strained substrate, the at least one  
dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and  
a device over each of the at least one dielectric gate oxide portion to complete the at least  
one high-k device.

32. (Previously presented) The device of claim 31, wherein the uppermost  
strained-Si epi layer has a thickness of from about 100 to 500Å, the middle  $Si_{1-x}Ge_x$  layer  
has a thickness of from about 700 to 1200Å and the lower silicon oxide layer has a  
thickness of from about 800 to 2000Å.

33. (Previously presented) At least one high-k device, comprising:  
a structure having a strained substrate formed thereover, the strained substrate comprising  
an uppermost strained-Si epi layer over an upper relaxed  $Si_{1-x}Ge_x$  layer over a graded  
 $Si_{1-y}Ge_y$  layer over an epi layer over a lowermost relaxed  $Si_{1-z}Ge_z$  layer, wherein  $x \geq y \geq z$ ;  
at least one dielectric gate oxide portion over the strained substrate, the at least one  
dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and  
a device over each of the at least one dielectric gate oxide portion to complete the at least  
one high-k device.

34. (Previously presented) The device of claim 33, the uppermost strained-Si epi  
layer having a thickness of from about 100 to 500Å; the upper relaxed  $Si_{1-x}Ge_x$  layer  
having a thickness of from about 1000 to 50,000Å; the graded  $Si_{1-y}Ge_y$  layer having a  
thickness of from about 2000 to 50,000Å; the epi layer having a thickness of from about

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20 to 500Å; and the lowermost relaxed  $\text{Si}_{1-z}\text{Ge}_z$  layer having a thickness of from about 200 to 50,000 Å.

35. (Previously presented) The device of claim 33, the uppermost strained-Si epi layer having a thickness of from about 150 to 300Å; the upper relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer having a thickness of from about 2000 to 40,000Å; the graded  $\text{Si}_{1-y}\text{Ge}_y$  layer having a thickness of from about 500 to 25,000Å; the epi layer having a thickness of from about 50 to 200Å; and the lowermost relaxed  $\text{Si}_{1-z}\text{Ge}_z$  layer having a thickness of from about 500 to 25,000Å.

36. (Previously presented) The device of claim 33, where  $x$  is no less than  $y$  and less than about 0.50, where  $y$  is no less than  $z$  proximate the epi layer and increases to about  $x$  proximate the upper relaxed  $\text{Si}_{1-x}\text{Ge}_x$  layer, and where  $z$  is greater than 0 and less than about 0.50.

37. (Previously presented) The device of claim 33, wherein the at least one dielectric gate oxide portion being comprised of  $\text{HfO}_2$  or  $\text{HfSiO}_4$ .

38. (Previously presented) The device of claim 41, wherein the relaxed  $\text{Si}_{1-y}\text{Ge}_y$  layer has a thickness of from about 200 to 30,000Å, the constant  $\text{Si}_{1-y}\text{Ge}_y$  layer has a thickness of from about 200 to 20,000Å, the silicon epi layer has a thickness of from about 20 to 500Å, the constant  $\text{Si}_{1-z}\text{Ge}_z$  layer has a thickness of from about 200 to 20,000Å, and the uppermost strained-Si epi layer has a thickness of from about 20 to 500Å.

39. (Previously presented) The device of claim 41, wherein the relaxed  $\text{Si}_{1-y}\text{Ge}_y$  layer has a thickness of from about 300 to 5000Å, the constant  $\text{Si}_{1-y}\text{Ge}_y$  layer has a

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thickness of from about 300 to 5000Å, the silicon epi layer has a thickness of from about 50 to 300Å, the constant Si<sub>1-x</sub>Ge<sub>x</sub> layer has a thickness of from about 300 to 5000Å, and the uppermost strained-Si epi layer has a thickness of from about 50 to 300Å.

40. (Previously presented) The device of claim 41, wherein the at least one dielectric gate oxide portion is comprised of HfO<sub>2</sub> or HfSiO<sub>4</sub>.

41. (Previously presented) At least one high-k device, comprising:  
a structure having a strained substrate formed thereover, the strained substrate comprising an uppermost strained-Si epi layer, a relaxed Si<sub>1-y</sub>Ge<sub>y</sub> layer under the uppermost strained-Si epi layer, a constant Si<sub>1-y</sub>Ge<sub>y</sub> layer under the relaxed Si<sub>1-y</sub>Ge<sub>y</sub> layer, a silicon epi layer under the constant Si<sub>1-y</sub>Ge<sub>y</sub> layer, and a constant Si<sub>1-x</sub>Ge<sub>x</sub> layer under the silicon epi layer, wherein the uppermost relaxed-Si epi layer is comprised of Si<sub>1-x</sub>Ge<sub>x</sub> wherein x is constant or graded;

at least one dielectric gate oxide portion over the strained substrate, the at least one dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and

a device over each of the at least one dielectric gate oxide portion to complete the at least one high-k device.

42. (New) At least one high-k device, comprising:  
a structure having a strained substrate formed thereover, the strained substrate comprising at least an uppermost strained-Si epi layer having a dislocation density of strained-Si epi of less than about 1E6/cm<sup>2</sup>;  
at least one dielectric gate oxide portion over the strained substrate, the at least one dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and  
a device over each of the at least one dielectric gate oxide portion to complete the at least one high-k device.

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43. (New) The structure of claim 42, wherein the at least one dielectric gate oxide portion is comprised of HfO<sub>2</sub>, HfSiO<sub>4</sub>, N-doped hafnium, HfSiO<sub>x</sub>, ZrO<sub>2</sub>, ZrSiO<sub>x</sub> or N-doped zirconium silicate.

44. (New) The device of claim 42, wherein the structure is a silicon substrate or a germanium substrate.

45. (New) The device of claim 42, wherein the strained substrate is comprised of only the uppermost strained-Si epi layer.

46. (New) At least one high-k device, comprising:  
a structure having a strained substrate formed thereover, the strained substrate comprising only an uppermost strained-Si epi layer having a thickness of from about 100 to 500Å;  
at least one dielectric gate oxide portion over the strained substrate, the at least one dielectric gate oxide portion having a dielectric constant of greater than about 4.0; and  
a device over each of the at least one dielectric gate oxide portion to complete the at least one high-k device.

47. (New) The device of claim 46, the uppermost strained-Si epi layer having a thickness of from about 150 to 300Å.

48. (New) The device of claim 46, the uppermost strained-Si epi layer having a thickness of from about 200 to 300Å.